flaring gametophyte of the water ferns, with the archegonia developed outside the spore. Since the female gametophyte of *Lepidocarpon* remains entirely within the megaspore, that of *Bothrodendron* represents a more primitive condition, in which the gametophyte is partly free from its spore.—J. M. C.

Cold air drainage.—In investigating the physical factors influencing the distribution of vegetation in the Santa Catalina Mountains, SHREVE[27] has found important differences in the temperature limits of stations at similar altitudes, but differently related to the ridges and valleys of the mountain slopes. These differences are shown to be due to valleys and cañons being frequently occupied by a stream of cooled air, and to amount to a difference in the mean minimum temperature equivalent to that usually experienced with an increase in altitude of 2350 feet. The influence of this cold air drainage seems to be most important in its effect upon the upward distribution of low-land species, and will do much to account for the higher range of these species upon the ridges and upper slopes of cañons.—GEO. D. FULLER.

Botryopterideae.—LIGNIER[28] has investigated *Stauropteris Oldhamia*, and its relations to the Botryopterideae, which he prefers to call Coenopterideae. Following the theory of the meriphyte, and including the sporangial structures, he reaches the conclusion that *Stauropteris* does not belong to the Coenopterideae, which represent an advanced group, but very near to the more primitive Primofilices. Incidentally he presents a "genealogical tree," which indicates that the Primofilices have given rise to three lines: (1) to the Coenopterideae (Botryopterideae) through *Stauropteris* as a start; (2) to the Marattiaceae through *Archaeopteris* and *Botrychium*, with a possible side branch leading to the Leptosporangiates; (3) to the Pteridosperms (Cycadofilicales).—J. M. C.

Standardizing atmometers.—The difficulties involved in subjecting a considerable number of atmometer cups to exactly similar conditions of temperature, humidity, and air movement for the period of time necessary for their standardization has caused LIVINGSTON[29] to devise a table rotating once per minute by means of a small electric motor belted to a reducing gear. The cups, mounted in suitable bottles, are placed near the outer margin of the table, and should a very high rate of evaporation be required an electric fan is made to furnish a current of air crossing the table. As the efficiency of the atmometer is largely dependent upon the accuracy of its standardization this device will prove helpful to ecological workers.—GEO. D. FULLER.

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[27] SHREVE, FORREST, Cold air drainage. Plant World **15**: 110–115. 1912.

[28] LIGNIER, O., Le *Stauropteris Oldhamia* Binney et les Coenoptéridées à la lumière de la théorie du mériphyte. Bull. Soc. Bot. France **59**: 1–33. *figs. 11.* 1912.

[29] LIVINGSTON, B. F., A rotating table for standardizing porous cup atmometers. Plant World **15**: 157–162. 1912.